



## MODULAR JACK SUBASSEMBLY FOR USE IN A NETWORK OUTLET

This invention is related to a connector insert assembly for use in a data communications network outlet assembly.

A data communications network includes network wiring which extends to a number of network outlet assemblies in a facility such as an office, campus, or factory. Each of the network outlet assemblies has at least one connector port for coupling with wiring from a piece of communications equipment. It is often desirable to change the type of equipment which is connected to a particular outlet assembly. Therefore, connector insert subassemblies with different types of connector ports have been made interchangeable in the network outlet assemblies. These connector port configurations can include hermaphroditic token ring mating receptacles, modular jack, balun and RS-232 interfaces.

U.S. Patent No. 4,765,695 discloses a network outlet assembly with interchangeable insert subassemblies which can be mounted in a standard wall box or a patch panel. Each of the insert subassemblies includes a mounting insert which holds a connector member. The mounting insert is securable in the wall box or patch panel, and the connector member is matable with a network wiring connector in the wall box or patch panel. The insert subassemblies must be of uniform size in order to be interchangeable.

The '695 patent discloses a connector member having a single modular jack. The mounting insert has two flexible snaps that extend rearwardly to secure the modular jack connector member to the mounting insert. These flexible snaps can satisfactorily accommodate a single modular jack; however, the flexible snaps are too large to accommodate dual modular jacks in a same size package as the single modular jack. Heretofore, it has

been necessary to use an adhesive to secure dual modular jacks to the mounting insert. Using an adhesive requires additional assembly steps which increases production costs.

5       The problem to be solved by the present invention is to secure a modular jack connector member to a mounting insert without an adhesive while maintaining a small size package.

10       A modular jack insert subassembly for use in a network outlet assembly includes a modular jack member and a mounting insert. The modular jack member has a pair of panel mount stops extending from opposite sides thereof. The mounting insert has a front portion defining a window or opening in which a mating face of  
15       the modular jack member is positioned, and a pair of resilient latch arms extending rearwardly from the front portion at respective opposite sides of the window. Each of the latch arms includes a latch member for  
20       securing the modular jack insert in the network outlet assembly, and an inwardly facing snap fastener. The snap fasteners are outwardly deflectable upon engagement with respective ones of the panel mount stops during  
25       insertion of the modular jack into the mounting window from the rear. Upon complete insertion of the modular jack member into the mounting window, the snap fasteners resile behind the panel mount stops to prevent withdrawal of the modular jack member from the mounting insert.

30       The invention will now be described by way of example with reference to the accompanying drawings wherein:

Figure 1 is an exploded perspective view of a network outlet assembly including two dual modular jack insert subassemblies;

35       Figure 2 is an exploded view of a shielded dual modular jack insert subassembly of the type shown in Figure 1;

Figure 3 is a perspective view showing the rear of a mounting insert that can be used in the dual modular jack insert assemblies shown in Figures 1 and 2;

Figure 4 is a top plan view, partially in section, showing a dual insert subassembly, of the type shown in Figures 1 and 2, and showing the manner in which two shielded modular jacks are mounted to the mounting insert shown in Figure 3;

Figure 5 is a view similar to Figure 4 showing an unshielded dual insert subassembly;

Figure 6 is a top plan view, partially in section, of the mounting insert shown in Figure 3; and

Figure 7 is a side section view of the mounting insert shown in Figure 3 and 6.

The network outlet assembly 2 shown in Figure 1 is a modular assembly comprising a mounting frame 4, edge connectors 6, a faceplate 8 and two dual modular jack subassemblies 10. The preferred embodiment of this network outlet assembly 2 serves as an interface point at which data communications equipment can be connected to the wiring in a local area network or other network of electrical components in an office, a factory, a laboratory or other facility. One version of a network assembly of this type is disclosed in U.S. Patent Application Serial Number 08/357,816 filed December 16, 1994 incorporated herein by reference. Another version of this type of network assembly is also disclosed in U.S. Patent 4,756,695 also incorporated herein by reference. These network outlet assemblies provide a convenient way in which the wiring employed in a network can be attached to input and output interface connectors or receptacles or ports to which components such as desktop computers and workstations can be attached. Appropriate modular insert subassemblies are used in these outlet assemblies for interconnection to the physical media or wiring used in a particular installation. For example, a modular jack insert can be

used with twisted wires, a coaxial insert with coaxial cable and a fiber optic connector with optical fiber cable. The appropriate insert subassembly is mounted on the mounting frame 4 and connected to the cable. The preferred embodiment of the dual modular jack insert subassembly 10 is a printed circuit board subassembly that is connected to the cable wiring by an edge connector 6. This outlet assembly is mounted in a wall box and a faceplate 8, having openings through which the connector on the insert subassembly is accessible is then attached to the mounting frame 4. These outlet assemblies are typically mounted in a standard wallbox, such as a standard NEMA wiring device box. The entire outlet assembly, excluding of course the faceplate, must be mounted in a standard 16 cu. in. single gang box. These commercially available outlet assemblies also have two insert subassemblies mounted one above the other so that more than one device can be attached or so that more than one cable, cable branch, or type of cable or physical media can be accommodated.

Insert modules or subassemblies, such as the dual modular jack insert subassembly 10 are also used in patch panel assemblies in addition to network outlet subassemblies. These patch panel assemblies are typically used in wiring closets or at network hubs and provide connection to the cable at the other end from the outlet subassemblies. Therefore the insert subassemblies must be small enough to fit in standard device boxes and to be used side by side in a patch panel array.

One embodiment of the dual modular jack insert subassembly 10 is shown in the exploded view of Figure 2. This representative view shows the components of a shielded dual modular jack subassembly comprising a pair of printed circuit board modular jacks 12 mounted on a printed circuit board or card 30. A metal shield 32 and a mounting insert 16 comprise the other components of

this subassembly. When assembled, the shield 32 surrounds the fronts of the two modular jacks 12 and is positioned between the printed circuit board mounted jacks and the mounting insert 16. An unshielded dual modular jack insert subassembly would use similar printed circuit board jacks and mounting insert 16, but omit the shield 32.

The modular jacks 12 comprise conventional panel stop printed circuit board jacks. Each jack 12 has a panel stop 14 located on one outer side. Conventional individual jacks of this type employ panel stops 14 each side. Two jacks of this type can be mounted side by side, virtually touching, by simply removing the inner panel stops. Alternatively each individual jack housing can be molded with only one panel stop or a two jack housing can be molded as one piece. Panel stops 14 are rectangular molded extensions of the molded jack housing in which jack contact terminals are disposed in a conventional manner. These panel stops are typically used in applications in which a jack is mounted in another component, such as a desktop computer. The panel stops usually engage the cover of a computer or similar device adjacent the opening through which the jack is accessible. In those applications, the panel stop positions the jack in the opening, it provides a mechanical stop to prevent damage to the jack if a modular jack cord is pulled and it also can help position the printed circuit board on which the jack is mounted. These panel stop modular jacks are therefore standard commercially available products that can be economically produced in quantity. Examples of commercially available panel stop modular jacks are AMP Part Number 555162-1 manufactured by AMP Incorporated. For most applications of this type RJ-45 modular jacks having eight contact positions and complying with Subpart F of the FCC-Part 68 Registration Rules are employed. Other modular jack configurations can also be

employed such as those suitable for Category 5 applications consistent with ANSI/EIA/TIA-568 (TIA-568) Commercial Building Telecommunications Wiring Standard and supplemental Technical Systems Bulletin TIA/EIA TSB  
5 (TSB40) Additional Transmission Specifications for Unshielded Twisted-Pair Connecting Hardware.

Mounting insert 16 shown in Figure 3 is a one-piece molded piece is used to mount the dual modular jack printed circuit board insert subassembly 10 to the  
10 mounting frame 4. Figures 6 and 7 are other views of this mounting insert 16 in which significant structural components are shown. Front portion 41 of this mounting insert also fits within openings in the faceplate 8 so that the insert assembly presents a flush appearance in  
15 the faceplate openings. A window 20 in the front portion 41 of the mounting insert is dimensioned to receive two side by side modular jacks 12. The lateral dimension of window 20 is slightly less than the lateral dimension of the mounting insert 16 since the  
20 combined width of two eight position modular jacks is only slightly less than the spacing between latches 17 that are used to secure the mounting insert subassembly to the mounting frame 4. Side posts or window jambs 26 extend vertically on both sides of the window 20.  
25 Mounting insert latch arms 18 extend rearward from the front portion 41 near each of these jambs 26. A rearwardly facing shoulder 28 is located at the back of each window jamb 26, and a snap fastener 22 on each latch arm 18 is spaced from the corresponding shoulder  
30 28 on each jamb. A channel is formed between oppositely facing surfaces on the shoulder 28 and snap fastener 22. The width of this channel 38 is substantially equal to the width of one of the modular jack panel stops 14. The height of the channel 38 is greater than the height  
35 of one panel stop 14 so the panel stop can fit securely into this channel. Each snap fastener 22 includes a rearwardly facing inclined surface 24 that cams the snap

fastener outward when the outer panel stops 14 on two side by side printed circuit board mounted modular jacks are inserted from the rear. The opposed facing surfaces on the jamb shoulder 28 and on the snap fastener 22 are parallel and extend parallel to the front face of the mounting insert 16 and to the front face of the modular jacks 12, and to the sides of the panel stops 14 when inserted into the channel 38 to secure the panel stops 14 in channels 38. The latch arms 18 are sufficiently flexible so that the snap fasteners 22 may cam outward to permit insertion of the printed circuit board mounted jacks with their panel stops 14 because the mounting insert is molded from a flexible material such as acrylonitrile-butadiene-styrene (ABS).

A ledge 40 is located below the printed circuit board to support the printed circuit board and two inverted L-shaped flanges 42 at opposite sides of the mounting insert 16 provide clearance for portions of printed circuit board 30 that may extend beyond the sides of the modular jacks 12. A lip 44 extends around much of the periphery of the mounting insert 16. This lip 44 will fit behind the faceplate 8. The lip is interrupted on the sides of the mounting insert latch arms 18 to provide clearance for molding these latches. Portions of the snap fasteners 22 extend into this section where the lip 44 is interrupted. This interruption in the lip adds to the flexibility of the latch arms 18, thus making it easier to insert the modular jack panel stops 14.

Each of the latch arms 18 has a latch member 19 at a remote end thereof for securing the insert 16 to the mounting frame 4 of the network outlet assembly which is shown in Fig. 1.

Figures 4 and 5 show two versions of the dual modular jack insert subassemblies 10. Figure 4 shows a shielded version and Figure 5 shows an unshielded



version. The manner in which the panel stops 14 fit within channels 38 between the shoulder 28 and the snap fastener 22 is shown in the sectioned portion of each figure. As shown in Figures 2 and 4 the shield 32 has  
5 two panel stop openings 34 through which the panel stops 14 extend. With or without the presence of the shield 32, the panel stops 14 fit in the channel in the same manner. Each of these versions of dual modular jack insert assemblies can be assembled by merely snapping  
10 the separate parts together without the need for separate fastening means such as adhesives or clips.

## CLAIMS

1. A modular jack insert subassembly 10 for use in  
a network outlet assembly 2, the modular jack insert  
5 subassembly including a modular jack member 12 and a  
mounting insert 16, the modular jack member 12 having a  
pair of panel mount stops 14 extending from opposite  
sides thereof, the mounting insert 16 having a front  
portion 41 defining a window 20 in which a mating face  
10 of the modular jack member 12 is positioned, and a pair  
of resilient latch arms 18 extending rearwardly from the  
front portion 41 at respective opposite sides of the  
window 20, each of the latch arms 18 including a latch  
member 19 for securing the modular jack insert  
15 subassembly in the network outlet assembly,  
characterized in that:

each of the latch arms 18 has an inwardly facing  
snap fastener 22, the snap fasteners being outwardly  
deflectable upon engagement with respective ones of the  
20 panel mount stops 14 during insertion of the modular  
jack member 12 into the mounting window 20 from the  
rear, wherein upon complete insertion of the modular  
jack into the mounting window, the snap fasteners 22  
resile behind the panel mount stops 14 to prevent  
25 withdrawal of the modular jack member from the mounting  
insert.

2. The modular jack insert subassembly according  
to claim 1, wherein the front portion 41 defines a  
30 rearwardly facing shoulder 28 which cooperates with the  
snap fasteners 22 to capture the panel mount stops  
therebetween.

3. The modular jack insert subassembly according  
35 to claim 2, wherein the rearwardly facing shoulder 28  
includes a pair of shoulder surfaces adjacent to  
respective ones of the latch arms 18.

4. The modular jack insert subassembly according to claim 1, wherein each said snap fastener 22 includes an inclined camming surface 24 which is engaged by a  
5 respective said panel mount stop 14 during insertion of the modular jack into the window.

5. The modular jack insert subassembly according to claim 1, wherein the modular jack member 12 includes  
10 a pair of modular jacks positioned side-by-side, and one said panel mount stop 14 extends from each of said modular jacks.

6. The modular jack insert subassembly according to claim 5, wherein each said modular jack is mounted on  
15 a printed circuit board 30.

7. The modular jack insert subassembly according to claim 5, wherein a shield 32 is mounted on the  
20 exterior of the modular jacks between the modular jacks and the mounting insert, the shield including openings 34 through which the panel mount stops protrude.

8. The modular jack insert subassembly according to claim 1, wherein a front of each modular jack is  
25 flush with a front of the mounting insert.

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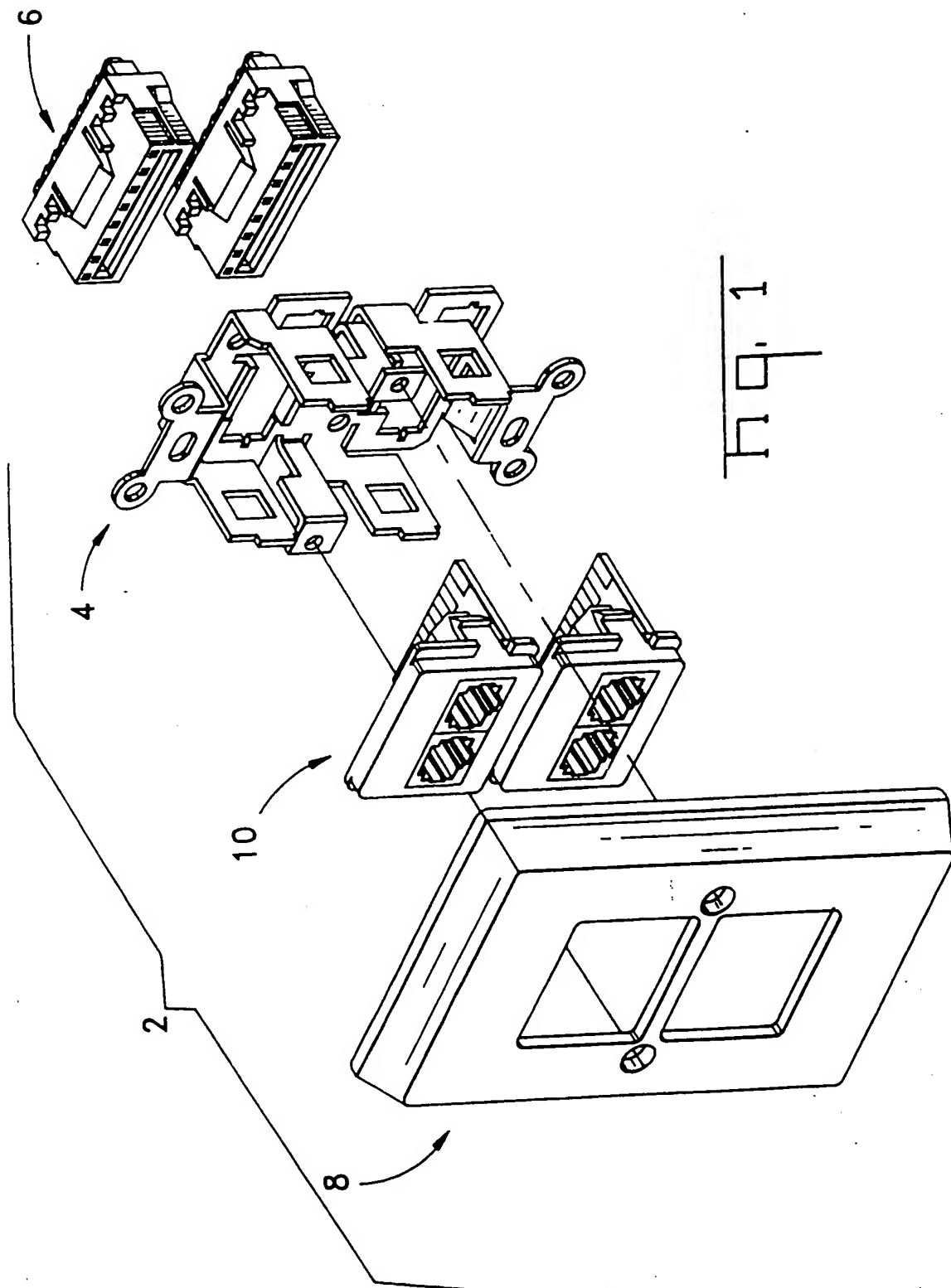


Fig. 1

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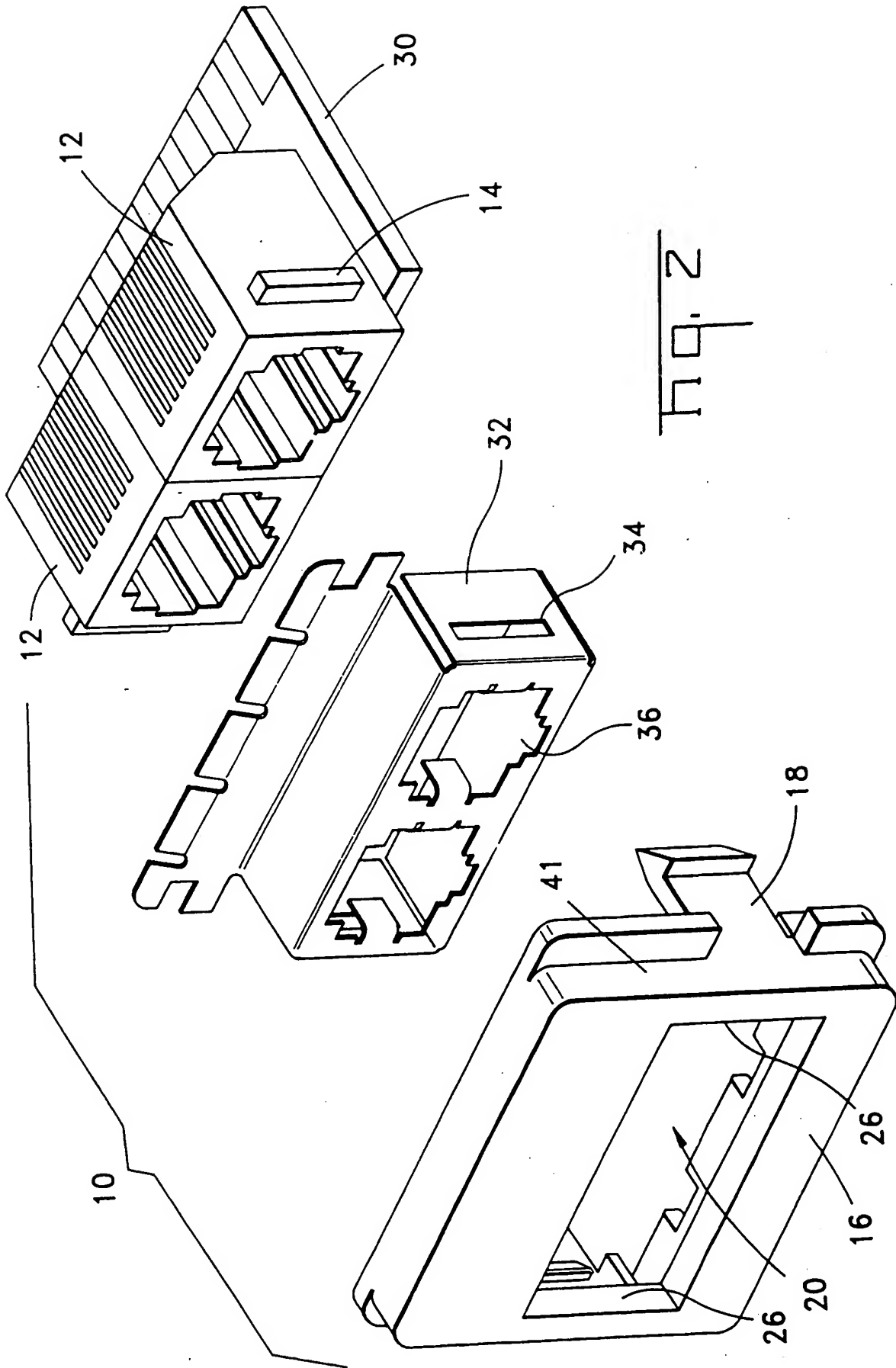
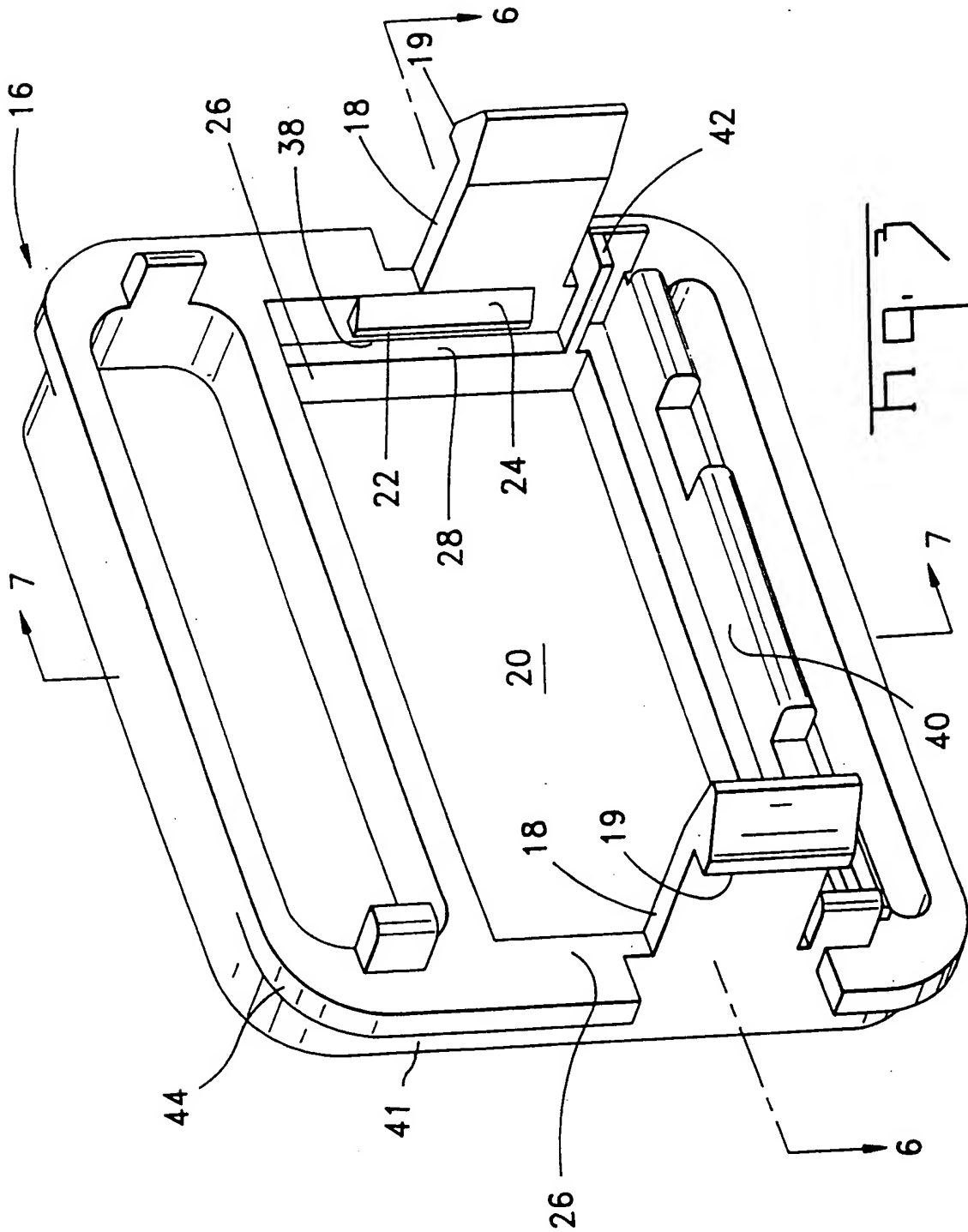
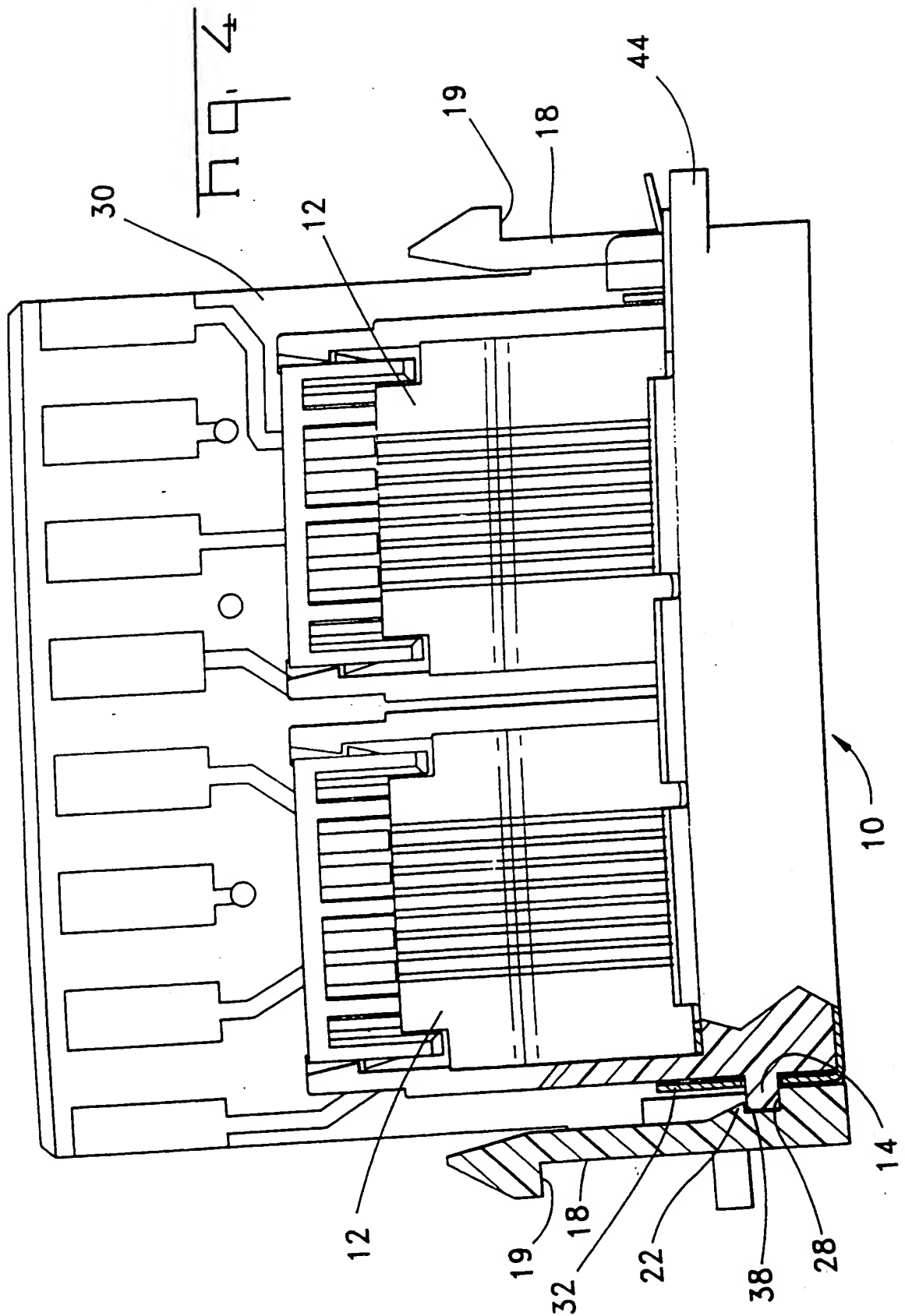


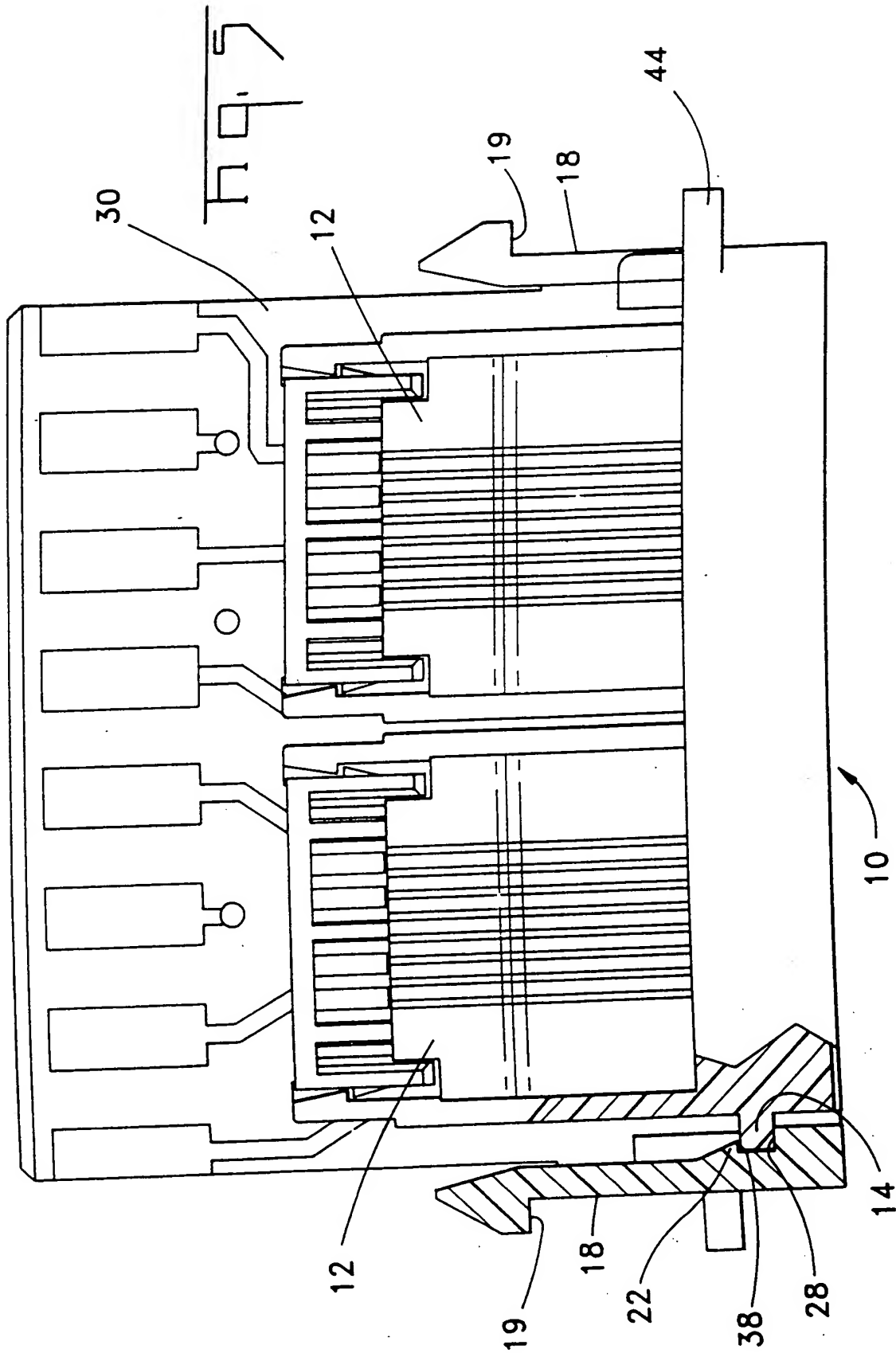
FIG. 2

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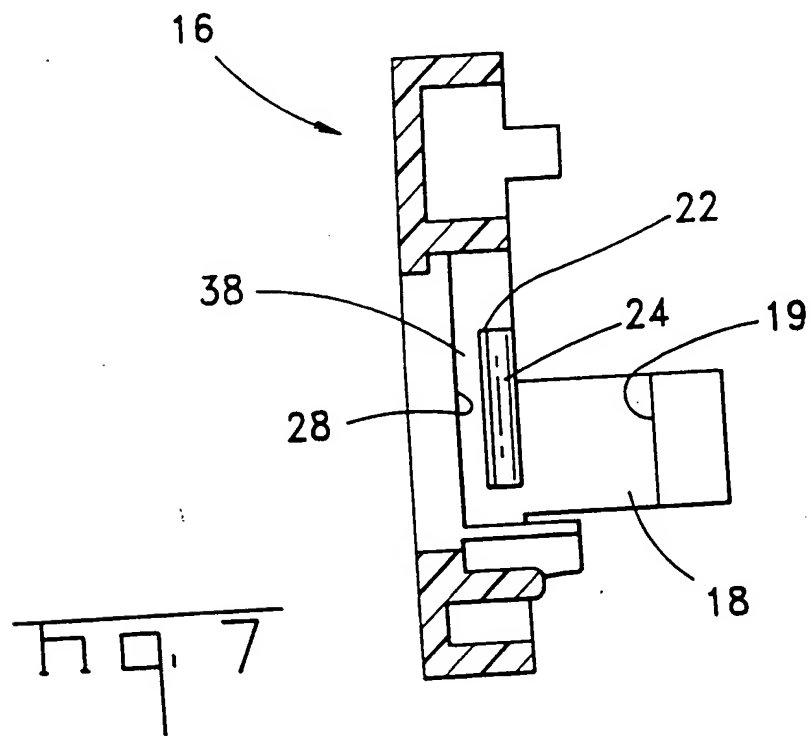
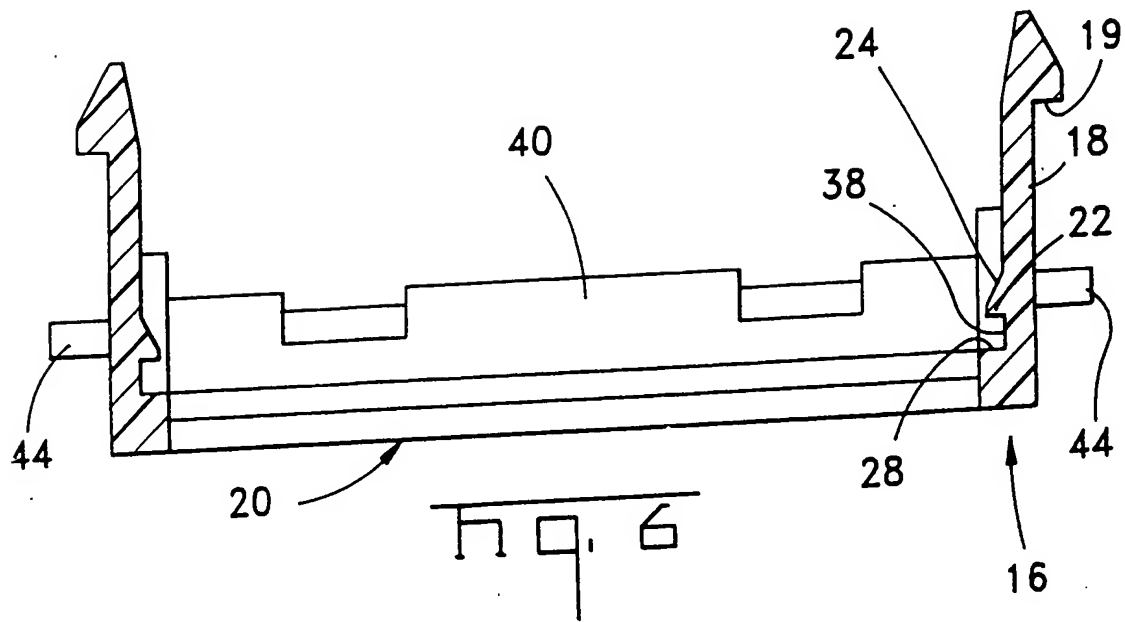


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# INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter Application No  
PC1, US 96/12688

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